Outcomes of Drug and Alcohol Treatment Programs Among American Indians in California

Elizabeth Evans, MA, Suzanne E. Spear, MS, Yu-Chang Huang, DrPH, and Yih-Ing Hser, PhD

Objectives. We examined differences in substance abuse treatment outcomes between American Indians and their non–American Indian counterparts in California, during 2000 to 2002.

Methods. A total of 368 American Indians and a matched sample of 368 non–American Indians from 39 substance abuse treatment programs in 13 California counties were assessed at multiple time points. Records on arrests, driving while under the influence of alcohol or drugs, and mental health care were obtained 1 year before and 1 year after treatment entry. Differences in pretreatment characteristics, services received, treatment satisfaction, treatment completion and retention, and outcomes were examined.

Results. Pretreatment problems were similarly severe among American Indians and non–American Indians. About half in both groups either completed treatment or stayed in treatment more than 90 days; American Indians in residential care had significantly shorter treatment retention. American Indians received fewer individual sessions and out-of-program services, especially for alcohol abuse, but were nevertheless generally satisfied with their treatment. Both groups improved after treatment, with American Indians demonstrating greater reductions in arrests than non–American Indians.

Conclusion. American Indians benefit from substance abuse treatment programs, although the type and intensity of services offered could be improved. (*Am J Public Health.* 2006;96:889–896. doi:10.2105/AJPH.2004.055871)

The serious health consequences associated with substance abuse among American Indians[1] demand that policymakers examine American Indian utilization of drug and alcohol treatment services and its relationship to improving health conditions. National outcome studies make sparse reference to the benefits of substance abuse treatment for American Indians. Local studies that examine American Indian data from individual programs often have small rural samples, focus primarily on alcohol treatment, and lack a non–American Indian comparison group. Taking advantage of a large treatment outcome study recently completed in California, we compared a comprehensive set of substance abuse treatment outcomes among American Indians and non–American Indians.

Although the patterns and treatment implications[2–4] of American Indian alcohol use have been well documented, posttreatment outcome studies are few, and results have been mixed.[5] Westermeyer's[6] 10-year follow-up of 45 hospitalized American Indians found that only 7 improved, whereas Shore and von Fumetti's[7] 4-year follow-up of 642 American Indian patients who received outpatient and residential care reported that slightly more than one quarter demonstrated clear improvement. Walker et al.[8] tracked an urban American Indian sample up to 2 years posttreatment and documented better outcomes among patients in outpatient care. Several other studies that followed American Indian patients for shorter time periods[9–11] found improvements such as decreases in alcohol consumption, adverse consequences, and social and legal problems. Other American Indian treatment research has focused on culturally infused interventions[12,13] and adolescent substance use and prevention strategies.[14–18] Very few studies have examined how American Indian adults entering treatment for alcohol and drug problems fare over time and if they do as well as other groups.

California is in a unique position to contribute to the research on American Indians. About 4.1 million people in the United States are American Indian/Alaska Native (1.5% of all Americans) and California has the largest American Indian population with 627 562 individuals.[19] Almost 6000 American Indians (accounting for more than 8000 admissions) annually receive substance abuse treatment in California. The present study capitalizes on the comprehensive data collected from patients in 39 treatment facilities that participated in the California Treatment Outcome Project (CalTOP). Specifically, we address 2 key research questions: (1) Aside from race/ethnicity, are American Indians different from non–American Indians at treatment entry on general characteristics and problem severity? and (2) How do substance abuse treatment outcomes differ among American Indians and non–American Indians? Given the current literature on the need for culturally appropriate services[20,21] and substance abuse severity among some American Indian populations, we hypothesized that compared with other patients, American Indians would present more severe problems, particularly with alcohol; leave treatment earlier; and demonstrate less favorable outcomes at follow-up.

Study Design

The California Treatment Outcome Project was a multisite prospective treatment outcome study[22] that was part of the national Treatment Outcomes and Performance Pilot Studies Enhancement, funded by the Center for Substance Abuse Treatment. Beginning in April 2000, data were collected over 2 years from all adults (n = 17 770) consecutively admitted to 43 programs in 13 California counties. Criteria for selecting the participating sites included demographics, patient flow, automation readiness, familiarity with assessment tools, geographic location, and project commitment. The programs represented all major modalities available in California, covered wide geographic locations, and included both urban and rural areas.

Patients participating in CalTOP were assessed at admission, and a subset was interviewed 3 and 9 months postadmission. Administrative records were obtained for the entire admission sample covering at least 12 months pre- and postadmission. The follow-up rates for the 3- and 9-month interviews were 90% and 78%, respectively. (See Hser et al.[22] for details.)

There were 368 American Indians treated in 39 CalTOP programs (21 outpatient, 14 residential, 4 narcotic replacement), mostly in El Dorado County (32.9%), followed by San Diego (14.5%), Alameda (11.9%), San Joaquin (10.6%), and Kern (7.5%) counties. Less than one quarter entered programs located in the 8 remaining CalTOP counties.

Participants

A sample of 368 American Indians and 368 non–American Indians were included in the present study. The non–American Indians were randomly selected from the remaining 17 402 CalTOP patients and matched to the American Indians in terms of treatment provider, primary drug problem, gender, and age (±3 years). Among American Indians, the mean age was 35.2 years, 51.4% were male, mean years of education was 11.6, approximately one quarter were employed full or part-time, and 44.6% reported alcohol as their primary drug problem followed by methamphetamine (28.0%) and marijuana (13.0%).

The 9-month follow-up rate was 70% among American Indians and 65% among non–American Indians. Attrition analysis of subjects who did and did not complete the follow-up interview revealed no significant differences in age, gender, education, treatment modality, employment status, living circumstances, legal situation, or primary drug use.

Treatment Programs

Questionnaires completed by the CalTOP program directors provided information on program characteristics. The "typical" treatment facility had been in operation for more than 18 years, was part of a larger organization, and had an average daily census of 116 patients (a median of 50). All were primarily drug treatment programs, and most had a mixture of public and private funding. Organizationally, most programs were 1 of several sites under a parent organization (72.1%) and some were independent organizations (16.3%) or part of a larger entity (e.g., 20.9% community-based, 9.3% hospital or other healthcare, 7.0% criminal justice). Most programs offered admission assessment and both individual and group alcohol and drug counseling. Because CalTOP focused on standardized measures across programs, limited data on program- or culture-specific information were collected. Thus, we do not know whether any of the 39 programs included in the present analysis offered special services for American Indians.

Patient Assessment and Follow-up Procedures

Study protocols and informed consent procedures were approved by 2 human subjects protection committees (at the University of California Los Angeles [UCLA] and the State of California Health and Human Services Agency), and a federal Certificate of Confidentiality was obtained to further safeguard data.[22]

All patients were assessed at admission and discharge, and their administrative records were obtained. Subsets were interviewed 3- and 9-months postadmission. Treatment staff conducted informed consent and an in-person assessment with entering adult patients as part of the normal administrative process. Telephone follow-up interviews were conducted by UCLA-trained interviewers (representing Asian, Hispanic, and White racial/ethnic backgrounds). Each interview lasted approximately 30 minutes; responses were entered into a computer and checked for internal consistency; and patients were paid $10 for the first interview and $15 for the second.

Official records on arrests, driving while under the influence of alcohol or drugs (DUI), and mental health care were obtained from the California Department of Justice, the California Department of Motor Vehicles, and the California Department of Mental Health.

Instruments and Measures

Treatment outcomes were based on the Addiction Severity Index (ASI) and records extracted from administrative data sources. Administered at treatment admission and 9 months postadmission, the ASI is a structured interview that assesses problem severity in 7 areas (alcohol use, drug use, employment, family and social relationships, legal, psychiatric, and medical status) and has been validated with diverse populations in a wide variety of settings.[23–25] A composite score can be computed for each scale to indicate severity in that area; scores range from 0 to 1 with higher scores indicating greater severity. In the logistic regression predicting outcomes, we included ASI scores multiplied by 10 to ease interpretation of odds ratios. Official records provided information on arrests, DUIs, and mental health care received in the 12 months after treatment admission.

Treatment retention was based on treatment records reported to the state database, and was defined as the number of days between program admission and discharge. For those without discharge records, we calculated length of stay from admission to the last day receiving services.

Treatment satisfaction was indicated by 3 measures at the 3-month follow-up that assessed patients' satisfaction with the program (7 items), services (12 items), and counseling relationships (3 items).[26] Satisfaction levels were rated with a 1-to-5 Likert scale, with higher scores indicating greater satisfaction, and a mean score for each of the 3 domains was calculated.

Services received was measured with the Treatment Services Review,[27] which gathered information on the number of professional services and discussion or counseling sessions that were received in each of the 7 ASI domains. Service intensity is the sum of the number of times that a patient received services (either in program or out of program through referrals) in the first 3 months of treatment.

Statistical Analysis

Group differences in pretreatment characteristics were examined using χ^2 tests for categorical variables and *t* tests for continuous variables (e.g., age, years of education, and ASI composite scores). Posttreatment outcome differences were examined with 3 types of analyses. We used paired *t* tests to assess whether changes in ASI composite scores from admission to follow-up were significantly

TABLE 1—Characteristics of Overall CalTOP Sample, American Indians, and Comparison Group at Treatment Admission: California, 2000–2002

	CalTOP (n = 17 770)	American Indians (n = 368)	Comparison Group (n = 368)
Mean age (SD)	35.5 (9.9)	35.2 (9.7)	34.9 (9.5)
Male, %	57.4	51.4	51.4
Race, %			
Native American	2.4	100.0	...
White	53.6	...	68.2
Hispanic	22.9	...	17.4
African American	16.8	...	12.0
Asian	3.1	...	1.1
Other	1.2	...	1.3
Education, % or mean			
Less than high school	33.8	38.4	31.8
High school	44.4	41.9	48.5
More than high school	21.8	19.6	19.6
Mean years of education (SD)	11.8 (2.1)	11.6 (1.8)	11.7 (2.1)
Modality, %			
Residential[a,b]	30.5	49.7	49.7
Outpatient drug-free	64.0	47.5	47.5
Narcotic replacement	5.5	2.7	2.7
Employment status, %			
Employed (full- or part-time)[a,c]	33.4	25.2	33.6
Unemployed	23.6	23.9	19.2
Not in the labor force	42.9	50.8	47.0
Have children < 18 years of age[a,b,c]	58.4	67.5	58.2
Homeless, %[b]	15.9	15.8	20.1
Married, %[b]	19.3	19.8	15.2
Legal status, %			
None	44.8	45.2	49.1
Probation or parole	55.1	54.8	50.9
Primary drug, %			
Alcohol[a,b]	27.4	44.6	44.6
Amphetamine	33.0	28.0	28.0
Marijuana	11.6	13.0	13.0
Heroin	15.0	8.4	8.4
Cocaine	11.1	5.4	5.4
Other	1.9	0.5	0.5
Frequency of primary drug use, %			
No use	47.9	49.7	49.2
1–3 times in past month	15.6	14.7	16.3
1–2 times in past week	8.7	8.2	7.6
3–6 times in past week	12.1	11.4	10.6
Daily	15.7	16.0	16.3
Alcohol use indicators 30 days prior to admission, %			
Used alcohol[b]	43.3	44.4	49.6
Used alcohol to intoxication[a,b]	24.8	32.3	32.2
Experienced alcohol problems[a,b]	38.1	52.6	48.0

Continued

different from zero. Next we applied analysis of covariance to examine the interaction between the group variable (American Indians vs control individuals) and ASI composite scores. Statistical significances on main and interaction effects were examined with F tests.

Finally, we applied logistic regression analysis to examine the occurrence of arrest and mental health services utilization after admission. Main covariates in each logistic model included group type (American Indians vs controls) and occurrence of an arrest or mental health services utilization before admission. Other controlling covariates included demographics, legal status, treatment modality, primary drug, and admission ASI composite scores. Statistical significance on odds ratios for each covariate was evaluated by Wald χ^2 test. All differences presented are significant at $P<.05$, unless noted otherwise.

RESULTS

Pretreatment Characteristics

Compared with the overall CalTOP sample (Table 1), more American Indians received residential care (49.7% vs 30.5%; $P<.05$), fewer were employed (25.2% vs 33.4%; $P<.05$), and more reported alcohol as the primary drug problem (44.6% vs 27.4%; $P<.05$), using alcohol to intoxication before treatment (32.3% vs 24.8%; $P<.05$), and experiencing more alcohol-related problems (52.6% vs 38.1%; $P<.05$).

The samples of American Indians and non–American Indians were similar on most characteristics (Table 1). The only exceptions are that employment at admission was significantly lower among American Indians than among non–American Indians (25.2% vs 33.6%; $P<.05$) and more American Indian patients had children younger than 18 years (67.5% vs 58.2%; $P<.05$). The 2 groups were also similar in alcohol use and problems during the month before admission and in the 7 ASI severity scores.

Treatment Retention

American Indians stayed more days in outpatient drug-free (non-methadone) treatment (mean = 132 days, SD = 123 vs mean = 121 days, SD = 121; means not significantly different) and fewer days in residential care

TABLE 1—*Continued*

Mean ASI composite score (SD)			
Alcohol[a]	0.18 (0.25)	0.24 (0.28)	0.24 (0.28)
Drug[a,b]	0.12 (0.12)	0.10 (0.12)	0.11 (0.12)
Employment[a,b]	0.68 (0.31)	0.76 (0.27)	0.70 (0.32)
Family[b]	0.17 (0.22)	0.18 (0.22)	0.20 (0.22)
Legal	0.16 (0.19)	0.17 (0.20)	0.18 (0.20)
Medical[b]	0.18 (0.31)	0.17 (0.31)	0.22 (0.32)
Psychiatric[a,b]	0.21 (0.24)	0.24 (0.25)	0.26 (0.25)

Note. CalTOP = California Treatment Outcome Project; ASI = Addiction Severity Index.
[a] Differences were significant between American Indians and the overall CalTOP sample, $P < .05$.
[b] Differences were significant between the comparison group and the overall CalTOP sample, $P < .05$.
[c] Differences were significant between American Indians and the comparison group, $P < .05$.

(mean=46 days, SD=52 vs mean=66 days, SD=91; means significantly different at <.01). About half of patients in both groups either stayed for 90 days or more or completed treatment (53.0% for American Indians and 53.8% for non–American Indians; not significantly different).

Treatment Satisfaction and Services Received

Table 2 shows that patients in both groups were similarly satisfied with their treatment program, counselor, and services received. The total mean number of services received was also equivalent (mean=165.0 services, SD=139.6 for American Indians vs mean=182.0 services, SD=191.1 for non–American Indians). Patients in both groups primarily received services related to use of drugs (mean=75.1 services, SD=53.3 vs mean=78.4 services, SD=96.8) and alcohol (mean=55.8 services, SD=64.8 vs mean=71.3 services, SD=100.1), some services dealing with mental illness (mean=18.0 services, SD=47.4 vs mean=12.6 services, SD=21.2), and much fewer services addressing medical problems, family conflicts, legal issues, or employment. None of these group differences was significantly different.

Further analysis revealed that most services were received within 1 program, although American Indians got significantly less care through referrals to other programs (mean=14.3 services, SD=39.6 vs mean=32.1 services, SD=82.2; $P<.05$), especially those that were related to alcohol use (mean=5.3 services, SD=20.3 vs mean=13.6 services, SD=42.5; $P<.05$). American Indians also received significantly fewer individual counseling sessions (mean=19.3 sessions, SD=25.1 vs mean=28.8 sessions, SD=44.9; $P<.05$) particularly when addressing alcohol use (mean=3.3 sessions, SD=6.4 vs mean=9.6 sessions, SD=21.8; $P<.05$), although they did get more group sessions to address psychiatric problems (mean=3.4 sessions, SD=13.7 vs mean=0.8 sessions, SD=2.7; $P<.05$).

Given the significant differences found between the 2 groups in terms of treatment retention and service intensity, we conducted regression analyses to examine whether service intensity affected treatment retention and if the interaction of service intensity and American Indian ethnicity impacted retention (data not shown). After we controlled for occurrence of previous arrests, DUIs, and mental health services utilization, the interaction of American Indian ethnicity and service intensity was significant for both individual and group sessions. Although service intensity was not related to retention for non–American Indians, increased service intensity for either individual or group services was positively related to treatment retention among American Indians in residential care. Although treatment retention in residential care was shorter for American Indians, increasing the number of individual sessions by 1 increased the stay in residential care by 1.4 more days for American Indians than for non–American Indians. Similarly, increasing the number of group sessions by 1 increased retention by 0.98 more days for American Indians than for non–American Indians.

Treatment Outcomes

ASI composite scores. Changes after treatment admission are succinctly summarized by the ASI composite scores and, as shown in Table 3, patients in both groups improved in all but 1 of the areas measured (improvement in the medical domain was not statistically significant). The analysis of covariance test on ASI composite scores at follow-up found no significant differences between American Indians and non–American Indians when we controlled for ASI scores at admission.

Alcohol use. Alcohol use and related problems decreased for both groups after treatment admission (data not shown). Whereas 31.2% of American Indians reported alcohol use in the 30 days before treatment, only 16.9% reported alcohol use at follow-up. Similarly, alcohol use to intoxication among American Indians dropped from 23.4% to 7.7%. Non–American Indians also displayed a decrease in alcohol use (from 50.9% to 20.2%) and use to intoxication (from 33.3% to 10.1%). In the same time period, problems related to alcohol use dropped by more than one third for both groups—from 48.4% to 13.9% among American Indians and from 50.0% to 7.4% among non–American Indians. None of the above changes from admission to follow-up were statistically significant between the 2 groups.

Arrests. In the year before treatment admission, 36.9% of American Indians and 42.1% of non–American Indians had been arrested. Arrests decreased for both groups during the 12 months after treatment admission (22.2% for American Indians and 33.4% for non–American Indians). The percent of American Indians arrested after admission demonstrated a reduction rate of 14.7%, whereas the reduction rate among non–American Indians was 8.7% (data not shown). Table 4 shows how the odds of being arrested varied across several characteristics. American Indians were significantly less likely to be arrested after admission. Arrests were less likely to occur among older patients and those in residential treatment. Patient characteristics that increased the likelihood of arrest were prior arrest history, being male, homelessness, use of illegal drugs (cocaine, heroin, amphetamine, or marijuana) rather than alcohol, and severe drug or family problems.

TABLE 2—Treatment Satisfaction and Service Intensity Among American Indians and Comparison Group: California, 2000–2002

	American Indians (n = 116)[a]			Comparison Group (n = 136)[a]		
	In Program Mean (SD)	Out of Program Mean (SD)	Overall Mean (SD)	In Program Mean (SD)	Out of Program Mean (SD)	Overall Mean (SD)
Treatment satisfaction						
Program	...	...	4.3 (0.43)	...	...	4.4 (0.70)
Counselor	...	...	4.3 (0.51)	...	...	4.2 (0.93)
Services	...	...	4.0 (0.56)	...	...	4.1 (0.78)
Service intensity						
Alcohol	50.4 (60.8)	5.3[b] (20.3)	55.8 (64.8)	57.7 (78.4)	13.6[b] (42.5)	71.3 (100.1)
Individual	3.2[b] (6.4)	0.1 (0.6)	3.3[c] (6.4)	7.7[b] (18.3)	1.8 (11.9)	9.6[c] (21.8)
Group	8.4 (15.0)	0.8 (8.3)	9.2 (18.1)	10.8 (20.2)	1.7 (11.1)	12.5 (25.7)
Drug	70.8 (50.3)	4.3 (22.8)	75.1 (53.3)	66.4 (85.0)	12.0 (43.3)	78.4 (96.8)
Individual	9.5 (10.2)	0.1 (0.6)	9.6 (10.1)	9.7 (18.3)	1.6 (10.5)	11.2 (20.5)
Group	23.6 (17.9)	0.3 (2.8)	23.9 (17.8)	19.3 (25.6)	2.4 (13.5)	21.7 (29.1)
Employment	1.7 (5.2)	0.4 (2.0)	2.1 (6.7)	3.9 (17.4)	0.9 (4.7)	4.7 (18.8)
Individual	0.5 (1.7)	0.1 (1.1)	0.6 (2.6)	1.2 (7.8)	0.1 (0.6)	1.3 (7.8)
Group	0.7 (3.6)	0. 1 (1.1)	0.8 (3.7)	0.6 (2.4)	...	0.6 (2.4)
Family	5.4 (21.5)	0.4 (2.9)	5.8 (21.6)	4.2 (10.8)	0.8 (4.1)	5.0 (11.8)
Individual	1.8 (9.6)	0.2 (1.4)	2.0 (9.7)	1.6 (4.7)	0.3 (1.7)	1.9 (5.0)
Group	1.3 (6.0)	...	1.3 (6.1)	0.7 (2.8)	0.04 (0.4)	0.7 (2.8)
Legal	2.2 (3.3)	0.1 (0.3)	2.2 (3.4)	1.9 (6.3)	0.6 (3.5)	2.5 (9.3)
Individual	0.8 (0.8)	0.01 (0.1)	0.8 (0.8)	0.6 (1.3)	0.3 (2.6)	1.0 (3.2)
Group	0.5 (2.5)	...	0.5 (2.5)	0.4 (2.6)	0.04 (0.5)	0.4 (2.7)
Medical	0.8 (3.6)	3.0 (9.6)	3.7 (11.4)	1.2 (3.1)	1.8 (3.2)	2.9 (5.3)
Individual	0.3 (1.3)	0.2 (1.3)	0.4 (1.8)	0.6 (1.7)	0.3 (1.2)	0.9 (2.1)
Group	0.4 (2.9)	0.5 (3.8)	0.9 (5.4)	0.3 (1.6)	...	0. 3 (1.6)
Psychiatric	17.4 (47.3)	0.6 (3.6)	18.0 (47.4)	11.2 (20.8)	1.4 (4.4)	12.6 (21.2)
Individual	2.4 (9.4)	0.1 (1.1)	2.5 (9.4)	2.6 (6.2)	0.3 (1.5)	2.9 (6.3)
Group	3.4[b] (13.7)	...	3.4[b] (13.7)	0.8[b] (2.7)	...	0.8[b] (2.7)
Total	150.8 (126.5)	14.3[b] (39.6)	165.0 (139.6)	150.0 (162.4)	32.1[b] (82.2)	182.0 (191.1)
Individual	18.5 (24.9)	0.7[b] (2.8)	19.3[b] (25.1)	24.0 (40.2)	4.7[b] (21.4)	28.8[b] (44.9)
Group	38.4 (35.6)	1.6 (10.5)	40.0 (36. 5)	32.8 (40.7)	4.2 (23.4)	37.1 (51.3)

[a]Only patients who had data at admission and at 3-month follow-up were included in the analysis (i.e., 116 American Indians and 136 patients in the comparison group).
[b]*t* tests on differences were significant between American Indians and the comparison group, $P < .05$.
[c]*t* tests on differences were significant between American Indians and the comparison group, $P < .01$.

Some differences were observed between the 2 groups in the type of arrest offense (data not shown). Significantly fewer American Indians had been arrested for a property-related offense (5.7% vs 12.7%; $P<.01$) before treatment, whereas about one quarter in both groups had been arrested for a drug-related offense or an "other" public offense such as vagrancy, public intoxication, or vandalism. There was a reduction in these arrests across types for both groups. Logistic regression analyses showed that American Indians were significantly less likely ($P<.01$) to be arrested for "other" public nuisance offenses but were similar to non–American Indians in arrests related to property, violence, or drugs.

About 7% of individuals in both groups had been arrested for a DUI in the year before treatment admission, but in the year after treatment admission American Indians had about half the number of DUI arrests as non–American Indians (1.8 % vs 4.5%), although this difference was not statistically significant. Logistic regression showed that men were 3.9 times more likely to be arrested for a DUI than were women (Table 4).

Mental health services utilization. About 17% of patients in both groups received mental health services in the year before treatment admission; this increased by 3.8% for both groups in the year following admission. Logistic regression analysis showed that mental health services utilization after admission was significantly correlated with services utilization before admission, placement in nonresidential substance abuse treatment, and medical or psychiatric illness.

TABLE 3—Problem Severity at Admission and 9-Month Follow-Up Among American Indians and Comparison Group: Addiction Severity Index Composite Scores, California, 2000–2002

	American Indians (n = 65[a])			Comparison Group (n = 109[a])		
	Admission Score Mean (SD)	Follow-up Score Mean (SD)	Mean Change	Admission Score Mean (SD)	Follow-up Score Mean (SD)	Mean Change
Alcohol	0.21 (0.28)	0.04 (0.12)	-0.17[b]	0.24 (0.28)	0.05 (0.15)	-0.19[b]
Drug	0.07 (0.11)	0.02 (0.05)	-0.05[b]	0.09 (0.11)	0.02 (0.06)	-0.07[b]
Employment	0.74 (0.28)	0.59 (0.33)	-0.15[b]	0.71 (0.31)	0.54 (0.32)	-0.17[b]
Family	0.20 (0.24)	0.07 (0.13)	-0.13[b]	0.24 (0.23)	0.12 (0.20)	-0.12[b]
Legal	0.15 (0.18)	0.04 (0.12)	-0.11[b]	0.16 (0.21)	0.03 (0.11)	-0.13[b]
Medical	0.23 (0.35)	0.20 (0.34)	-0.03	0.22 (0.32)	0.21 (0.35)	-0.01
Psychiatric	0.25 (0.25)	0.16 (0.22)	-0.09[b]	0.25 (0.23)	0.15 (0.22)	-0.10[b]

Note. Analysis of covariance test on Addiction Severity Index composite scores at follow-up with control for score at admission found no significant differences between American Indians and the comparison group, $P < .05$.
[a]Only patients who had Addiction Severity Index composite scores at admission and at 9-month follow-up were included in the analysis (i.e., 65 American Indians and 109 patients in the comparison group).
[b]Paired *t* test on "mean change" was significantly different from zero, $P < .05$.

DISCUSSION

Our study led us to reject our hypotheses that compared with other patients of similar gender, age, primary drug problem, and treatment facility, American Indians entering California's alcohol and drug treatment programs would present more severe problems and demonstrate less favorable outcomes at follow-up. Instead, we found that problems were similarly severe among American Indians and non–American Indians and that both groups demonstrated reductions in problem severity across multiple domains. Notably, American Indians in our sample demonstrated better outcomes than non–American Indians in terms of reduced "public nuisance" arrests after treatment admission.

The pattern of improvements observed in our sample contrasted with previous studies on longitudinal treatment outcomes among American Indians. Our results, however, are consistent with those observed among the overall CalTOP sample[22] and among samples reported on by other general studies.[28–31] Although direct comparisons are precluded by pretreatment differences, the improvements among American Indians are similar to changes observed among the overall CalTOP sample. For example, the overall sample and American Indians demonstrated significant reductions in problem severity in all 7 ASI domains at follow-up (with the exception that the reduction in medical problems for American Indians was not statistically significant). Similarly, like the overall sample, American Indians showed decreases in the occurrence of DUIs and arrests and an increase in utilization of mental health services 1 year after treatment.

Although lacking program- and cultural-specific information, the present study provided some measures of treatment process. Our hypothesis that American Indians would leave treatment earlier was partially supported. About half of patients in both groups stayed in treatment for the amount of time needed to maximize the benefits of treatment. Both groups also received comparable services and were generally satisfied with the treatment program, counselor, and services. However, American Indians treated in residential programs had significantly shorter retention than non–American Indians. American Indians also received fewer individual counseling sessions. Finally, despite greater unemployment among American Indians before treatment admission, they did not receive more services for employment problems; employment services were minimal for both groups. Attention to these discrepancies may facilitate greater improvement in outcomes for both groups, and particularly for the American Indians.

Importantly, our study demonstrated that greater service intensity (for both individual and group services) was critical for increasing treatment retention among American Indians in residential care. Other studies have also indicated that greater service intensity and treatment satisfaction are positively related to either treatment completion or longer retention, which, in turn, has been related to favorable treatment outcomes.[26] This principle, in conjunction with our findings, suggests that American Indians would benefit from a more intense level of services that cover not just substance abuse but other problems as well.

Implications for our findings need to be discussed within the context of a few limitations. For example, the agencies participating in CalTOP were not randomly selected and alcohol-only programs were excluded. It is therefore possible that the observed patterns are not generalizable to other programs that do not provide similar services. Also, the reliability and validity of self-reported information is uncertain. In addition, administrative data were drawn only from records maintained by the State of California, and so events that may have occurred in other states were not studied. Furthermore, insufficient treatment program information was gathered, limiting our ability to identify or investigate culturally specific components of treatment. Finally, American Indians are a heterogeneous population with differences among tribal groups. Although patients self-identified as American Indian, their involvement with American Indian cultures was not ascertained.

Although our analysis was limited to the information that had already been gathered by CalTOP, data were collected in real-world settings using standardized procedures and instruments, permitting comparisons across diverse groups and thus presenting a unique opportunity to assess relevant issues among American Indians. National reports show that American Indian populations suffer more from substance abuse and related health consequences compared with other racial/ethnic groups.[1,32] Moreover, American Indians have limited access to quality health care[33] and, along with other minorities, are more likely to underutilize or be disconnected from regular sources of care and the health care system overall.[34,35] Thus, it is important to understand how American Indians are impacted by

TABLE 4—Logistic Regression Models Predicting Arrests, DUIs, and Mental Health Services Utilization During 12 Months After Treatment Admission in California, 2000–2002 (n = 736)

	Arrests, OR	DUIs, OR	Mental Health Services, OR
Occurrence of arrests, DUIs, or mental health services utilization during 12 months prior to treatment admission (vs no occurrence)	3.6**	1.1	19.5**
American Indians (vs comparison group)	0.5**	0.4	1.1
Age[a]	0.9**	1.0	1.0
Male (vs female)	1.5*	3.9*	0.8
High school graduate or higher (vs less than high school)	0.7	0.8	1.2
Residential treatment (vs outpatient or methadone maintenance)	0.4**	0.8	0.6*
Employed (vs others)	1.0	0.8	0.8
Have children aged < 18 years (vs do not have any children aged < 18 years)	1.3	0.7	1.3
Homeless (vs not homeless)	2.1**	0.4	0.9
Married (vs other marital status)	1.1	1.9	0.6
Legal status (vs no legal status)	1.2	1.2	0.7
Primary drug			
Cocaine (vs alcohol)	4.5**	0.8	0.8
Heroin (vs alcohol)	3.0**	1.5	1.0
Amphetamine (vs alcohol)	2.0*	0.1	0.9
Marijuana (vs alcohol)	1.9*	0.5	1.8
Addiction Severity Index composite score × 10[b] (at admission)			
Alcohol	1.1	1.1	1.0
Drug	1.2*	1.1	1.1
Employment	1.0	.0	1.0
Family	1.1**	1.1	1.0
Legal	1.0	1.9	1.0
Medical	1.0	1.1	1.2**
Psychiatric	0.9	0.9	1.2**

Note. DUI = record of driving while under the influence of alcohol or drugs; OR = odds ratio.
[a]OR represents a 1-year change in age.
[b]OR represents a 10-unit (or 0.1) change in composite score.
*$P < .05$; **$P < .01$ (χ^2 test on estimate of OR).

the substance abuse treatment services that they utilize.

Our study represents the first to document the health, social, economic, and legal outcomes for American Indians served by diverse substance abuse treatment programs in several California counties. It is encouraging that American Indians in our sample decreased their rates of drug and alcohol use and made improvements in other areas impacted by substance abuse. These nonspecialized substance abuse treatment programs were able to address the needs of their American Indian patients, although the type and intensity of services offered could be improved. Further examination is needed to understand how factors such as culture, ethnicity, geography, and acculturation within mainstream American society affect American Indians' responses to treatment. ■

About the Authors

The authors are affiliated with the Neuropsychiatric Institute's Integrated Substance Abuse Programs at the University of California, Los Angeles.

Requests for reprints can be sent to Elizabeth Evans, UCLA Integrated Substance Abuse Programs, 1640 South Sepulveda Blvd, Suite 200, Los Angeles, CA 90025 (e-mail: laevans@ucla.edu).

This article was accepted April 1, 2005.

Contributors

E. Evans supervised data collection and analyses, wrote the sections on study design and results, and assisted with the literature review. S.E. Spear suggested the topic, led the literature review, and assisted with interpretation of data. Y.-C. Huang conducted and summarized statistical analyses. Y.-I. Hser conceptualized the study and provided guidance with statistical analyses and interpretation of results.

Acknowledgments

This study was supported in part by the California Department of Alcohol and Drug Programs under the Center for Substance Abuse Treatment's Treatment Outcomes and Performance Pilot Studies Enhancement project (grant 1-UR1-TI11478-01). Hser is also supported by an Independent Scientist Award (K02-DA-00139).

Human Participant Protection

Study protocols and informed consent procedures were approved by 2 human subjects protection committees—at the University of California Los Angeles and the State of California Health and Human Services Agency—and a federal Certificate of Confidentiality was obtained to further safeguard data.

References

1. Eliminating health disparities in the American Indian and Alaska Native community. US Department of Health and Human Services Web site. Available at: http://www.hhs.gov/news/press/2003pres/fsindian90803.html. Accessed September 20, 2004.

2. May PA, Gossage P. New data on the epidemiology of adult drinking and substance use among American Indians of the northern states: male and female data on prevalence, patterns, and consequences. *Am Indian Alsk Native Ment Health Res.* 2001;10:1–26.

3. Walker RD, Lambert MD, Walker PS, Kivlahan DR. Treatment implications of comorbid psychopathology in American Indians and Alaska Natives. *Cult Med Psychiatry.* 1992–1993;16:555–572.

4. Westermeyer J, Neider J, Westermeyer M. Substance use and other psychiatric disorders among 100 American Indian patients. *Cult Med Psychiatry.* 1992–1993;16:519–529.

5. Abbott PJ. Traditional and western healing practices for alcoholism in American Indians and Alaska Natives. *Subst Use Misuse.* 1998;33:2605–2646.

6. Westermeyer J, Peake E. A ten-year follow-up of alcoholic Native Americans in Minnesota. *Am J Psychiatry.* 1983;140:189–194.

7. Shore JH, von Fumetti B. Three alcohol programs for American Indians. *Am J Psychiatry.* 1972;128:1450–1454.

8. Walker RD, Benjamin GA, Kivlahan D, Silk-Walker P. American Indian alcohol misuse and treatment outcome. In: Spiegler D, Tate D, Aitken S, Christian C, eds. Alcohol use among US ethnic minorities. Proceedings of a conference on the epidemiology of alcohol use and abuse among ethnic minority groups. Washington, DC: US Government Printing Office; 1989:301–311. NIAAA research monograph 18, DHHS publication ADM 89-1435.

9. Kelso D, Fillmore KM. *Overview: Alcoholism Treatment and Client Functioning in Alaska. A Summary of Findings and Implication of a Follow-up Study of Individuals Receiving Alcoholism Treatment.* Juneau, Alaska: State Office on Alcoholism and Drug Abuse; 1984. Cited by: Abbott PJ. Traditional and Western healing practices for alcoholism in American Indians and Alaska Natives. *Subst Use Misuse.* 1998;33:2605–2646.

10. Neale Query JM. Comparative admission and follow-up study of American Indians and whites in a youth chemical dependency unit on the North Central Plains. *Int J Addict.* 1985;20:489–502.

11. Chong J, Herman-Stahl M. Substance abuse treatment outcomes among American Indians in the Telephone Aftercare Project. *J Psychoactive Drugs.* 2003; 35:71–77.

12. Gossage JP, Barton L, Foster L, et al. Sweat lodge ceremonies for jail-based treatment. *J Psychoactive Drugs.* 2003;35:33–42.

13. Mills PA. Incorporating Yup'ik and Cup'ik Eskimo traditions into behavioral health treatment. *J Psychoactive Drugs.* 2003;35:85–88.

14. Beauvais P. Trends in drug use among American Indian students and dropouts, 1975 to 1994. *Am J Public Health.* 1996;86:1594–1598.

15. Gfellner BM, Hundleby JD. Patterns of drug use among native and white adolescents: 1990–1993. *Can J Public Health.* 1995;86:95–97.

16. Mitchell CM, Novins DK, Holmes T. Marijuana use among American Indian adolescents: a growth curve analysis from ages 14 through 20 years. *J Am Acad Child Adolesc Psychiatry.* 1999;38:72–78.

17. Plunkett M, Mitchell CM. Substance use rates among American Indian adolescents: regional comparisons with monitoring the future high school seniors. *J Drug Issues.* 2000;30:575–592.

18. Stivers C. Drug prevention in Zuni, New Mexico: creation of a teen center as an alternative to alcohol and drug use. *J Community Health.* 1994;19:343–359.

19. Ogunwole SU, for the United States Census. The American Indian and Alaska Native population: 2000 census brief. Washington, DC: US Dept of Commerce; 2002. Available at: http://www.census.gov/prod/2002pubs/c2kbr01–15.pdf. Accessed September 20, 2004.

20. Hall RL. Alcohol treatment in American Indian populations: an indigenous treatment modality compared with traditional approaches. In: Babor TF, ed. *Alcohol and Culture: Comparative Perspectives From Europe and America. Annals of the New York Academy of Sciences.* New York, NY: New York Academy of Sciences; 1986;472:168–178.

21. Nebelkopf E, King J. A holistic system of care for Native Americans in an urban environment. *J Psychoactive Drugs.* 2003;35:43–52.

22. Hser YI, Evans E, Teruya C, et al., for the UCLA Integrated Substance Abuse Programs. The California Treatment Outcome Project (CalTOP): final report. California Department of Alcohol and Drug Programs; 2002. Available at: http://www.uclaisap.org/caltop/index.htm. Accessed September 20, 2004.

23. McLellan AT, Luborsky L, Woody GE, O'Brien CP. An improved diagnostic evaluation instrument for substance abuse patients: the Addiction Severity Index. *J Nerv Ment Dis.* 1980;168:26–33.

24. McLellan AT, Kushner H, Metzger D, et al. The fifth edition of the Addiction Severity Index. *J Subst Abuse Treat.* 1992;9:199–213.

25. Carise D, McLellan AT. Increasing cultural sensitivity of the Addiction Severity Index: An example with Native Americans in North Dakota. Washington, DC: Center for Substance Abuse Treatment; 1999.

26. Hser YI, Evans E, Huang D, Anglin DM. Relationship between drug treatment services, retention, and outcomes. *Psychiatr Serv.* 2004;55:767–774.

27. McLellan AT, Alterman AI, Cacciola J, Metzger D, O'Brien CP. A new measure of substance abuse treatment. Initial studies of the treatment services review. *J Nerv Ment Dis.* 1992;180:101–110.

28. Anglin MD, Hser YI. Treatment of drug abuse. In: Tonry M, Wilson Q, eds. *Drugs and Crime.* Chicago, Ill: The University of Chicago; 1990:393–460.

29. Hubbard RL, Marsden ME, Rachal JV, et al. *Drug Abuse Treatment: A National Study of Effectiveness.* Chapel Hill, NC: University of North Carolina Press; 1989.

30. Simpson DD, Joe GW, Rowan-Szal GA. Drug abuse treatment retention and process effects on follow-up outcomes. *Drug Alcohol Depend.* 1997;47:227–235.

31. Aria AM, and the TOPPS II Interstate Cooperative Study Group. Drug treatment completion and post-discharge employment in the TOPPS-II Interstate Cooperative Study. *J Subst Abuse Treat.* 2003;25:9–18.

32. American Indians/Native Alaskans. Substance Abuse and Mental Health Services Administration National Clearinghouse for Alcohol and Drug Information Web site. Available at: http://www.ncadi.samhsa.gov/govpubs/phd627/amerind.aspx. Accessed September 20, 2004.

33. Scott BS. Indian health service continues to provide for millions: Medicare and Medicaid work hard to keep up. In: *Closing the Gap: Working toward our Goal–Eliminating Racial and Ethnic Disparities in Health.* Washington, DC: Office of Minority Health, US Dept of Health and Human Services; 2003:14. Available at: http://www.omhrc.gov/OMH/sidebar/archivedctg.htm. Accessed September 20, 2004.

34. Collins KS, Hughes DL, Doty MM, Ives BL, Edwards JN, Tenney K, for The Commonwealth Fund 2001 Health Care Quality Survey. Diverse communities, common concerns: assessing health care quality for minority Americans; 2002. Available at: http://www.cmwf.org/programs/minority/collins_diversecommunities_523.pdf. Accessed September 20, 2004.

35. LaFromboise TD. American Indian mental health policy. *Am Psychol.* 1988;43:388–397.